Patent **Attorney Docket No.: SAE 12553/127**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANTS	:	Ming Gao YAO et al.
SERIAL NO.	:	10/763,727
FILED	:	January 23, 2004
FOR	:	PIEZOELECTRIC ACTUATOR WITH CONDUCTIVE LAYER BETWEEN ACTUATOR FINGER AND INSULATING LAYER
GROUP ART UNIT	:	2627
EXAMINER	:	Craig A. RENNER

VIA FACSIMILE

M/S: APPEAL BRIEF – PATENTS
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

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Date: March 13, 2007

Signature Barbara Vance

Barbara Vance

ATTENTION: Board of Patent Appeals and Interferences

APPEAL BRIEF

Dear Sir:

This brief is in furtherance of the Notice of Appeal, filed in this case on January 11, 2007.

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1. REAL PARTY IN INTEREST

The real party in interest in this matter is SAE Magnetics (H.K.) Ltd. (Recorded January 6, 2003; Reel/Frame 013668/0870).

2. RELATED APPEALS AND INTERFERENCES

There are no related appeals.

3. STATUS OF THE CLAIMS

Claims 10-21 are pending in the application. Claims 10, 13-16 and 19-21 are rejected under 35 U.S.C. §102(a), as being anticipated by Shiraishi et al. (JP 2002-074870), hereinafter ("Shiraishi"). Claims 11-12 and 17-18 are rejected under 35 U.S.C. §103(a) as being unpatentable over Shiraishi.

4. STATUS OF AMENDMENTS

The claims listed on page A-1 of the Appendix attached to this Appeal Brief reflects the present status of the claims.

5. SUMMARY OF THE CLAIMED SUBJECT MATTER

The present invention relates to magnetic hard disk drives. More specifically, the present invention relates to a system and method for preventing piezoelectric micro-actuator manufacturing and operational imperfections.

The embodiment of independent claim 10 generally describes an actuator component comprising at least one layer of electrically-conductive material (*See e.g.*, paragraph [0015] – Figure 6, 622) and at least one layer of electrically-insulative material (*See e.g.*, paragraph [0015] – Figure 6, 624), whercin said conductive material and said insulative material are to be applied to an actuator finger one layer upon another in an alternating manner (*See e.g.*, paragraph [0016] – Figure 7); and said layer of insulative material is larger in area than said layer of conductive material such that an insulative layer (*See e.g.*, paragraph [0019] – Figure 8), applied to said actuator finger and sandwiching a conductive layer between said insulative layer and said actuator finger (*See e.g.*, paragraph [0016] – Figure 7), at least partially encloses and electrically isolates said conductive layer (*See e.g.*, paragraph [0019]).

The embodiment of independent claim 16 generally describes a piezoelectric actuator comprising an actuator finger to receive application of at least one layer of electrically-conductive material (*See e.g.*, paragraph [0015] – Figure 6, 622) and at least one layer of electrically-insulative material (*See e.g.*, paragraph [0015] – Figure 6, 624), said application being one layer upon another in an alternating manner (*See e.g.*, paragraph [0016] – Figure 7), wherein said layer of insulative material is larger in area than said layer of conductive material such than an insulative layer (*See e.g.*, paragraph [0019] – Figure 8), applied to said actuator finger and sandwiching a conductive layer between said insulative layer and said actuator finger (*See e.g.*, paragraph [0016] – Figure 7), at least partially encloses and electrically isolates said conductive layer (*See e.g.*, paragraph [0019]).

Figure 1 provides an illustration of a drive arm configured to read from and write to a magnetic hard disk as used in the art. **Figure 2** provides an illustration of a micro-actuator as

used in the art. **Figure 3** provides an illustration of a 'U'-shaped micro-actuator utilizing multi-layered piezoelectric transducers (PZT) to provide slider actuation. **Figure 4** illustrates a potential problem of particulate-enabled shorting between piezoelectric layers. **Figure 5** illustrates various problems affecting PZT performance. **Figure 6** provides a cross-section of the micro-actuator arms with the micro-actuators unseparated and a cross-section of a micro-actuator arm after micro-actuator separation. **Figure 7** provides a cross-section of the micro-actuator arms with the micro-actuators unseparated and a cross-section of a micro-actuator arm after micro-actuator separation under principles of the present invention.

6. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

A. Are claims 10, 13-16 and 19-21 anticipated under 35 U.S.C. §102(a) by Shiraishi?

B. Are claims 11-12 and 17-18 rendered obvious under 35 U.S.C. §103(a) by Shiraishi?

7. ARGUMENT

A. Claims 10, 13-16 and 19-21 are <u>not</u> anticipated under 35 U.S.C. §102(a) by Shiraishi.

B. Claims 11-12 and 17-18 are <u>not</u> rendered obvious under 35 U.S.C. §103(a) by Shiraishi.

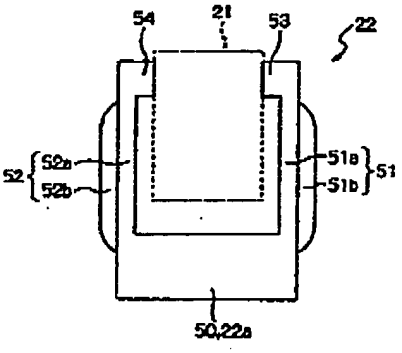
Applicants submit the cited reference Shiraishi does not teach, suggest or describe at least "[a]n actuator component comprising: at least one layer of electrically-conductive material; and at least one layer of electrically-insulative material ... *sandwiching a conductive layer between*

said insulative layer and said actuator finger..." (*e.g.*, as described in claim 10).

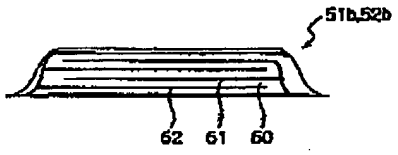
The Examiner asserts that Shiraishi teaches an electrically insulative material (citing element 60 above lower-most element 61), a conductive material (citing element 61) and an actuator finger (52a), citing Figure 6. It also asserts Shiraishi teaches sandwiching a conductive layer between the insulating layer and said actuator finger, citing Figures 5-6. *See* Office Action dated 2/3/2006, paragraph 4. Applicants disagree for at least the reasons described below.

First, Applicants disagree with the Examiner's contention that element 60 is the same as the "insulative material", element 61 is the same as the "conductive material", and element 52a is the same as the "actuator finger" as described in embodiments of the present application. They are not. However, even if one were to assume, only *arguendo*, that they were the same, the Shiraishi reference would still fail to describe *sandwiching a conductive layer between the insulative layer and the actuator finger*. As stated above, to support its rejection, the Examiner merely cites Figures 5 and 6. Figures 5 and 6 of Shiraishi are reproduced below:

【図5】



【図6】



Applicants submit Figure 6 merely illustrates layers 60, 61, and 62 cited by the Examiner as part of one element 51b, 52b, which is one component of the of the actuator structure shown in Figure 5.

In order to show an embodiment wherein *a conductive layer is sandwiched between the insulative layer and the actuator finger*, the Shiraishi reference would need to show element 61 *sandwiched between* element 60 and element 52a. However, as is apparent from the cited figures, element 61 (the alleged conductive layer) is located in between two layers of element 60 (the alleged insulative layer), which is further located in between element 62 (a ground layer). Element 52a (shown in Figure 5) is wholly separate from the structure in Figure 6 including cited elements 60 and 61.

The Examiner asserts when element 52b is placed on the alleged actuator finger 52a, a conductive layer will BE sandwiched between the insulative and the actuator finger. *See* Office Action dated 10/11/2006, paragraph 7. Applicants disagree, and note the Examiner offers no support from the reference itself for this assertion.

Moreover, Applicants submit an examination of Figure 5 of the cited reference disproves the Examiner's assertion. Specifically, element 52b is never placed *on top of* the alleged actuator finger 52a; it is located *on the side* of element 52a. This is affirmed by the Examiner as well. *See* Advisory Action dated 1/26/2007, page 3. Therefore, since element 52b is located on the side of element 52a, it is impossible for any part of element 52b to be sandwiched by element 52a. As stated above, element 61 of structure 52b is located in between element 60, which is further located in between element 62. Therefore, Figures 5 and 6 of Shiraishi fail to teach at least these relevant limitations.

The Examiner asserts that the claims do not preclude other layers from also being sandwiched between the insulative layer and actuator finger. *See* id. Applicants submit the term "sandwiched" is easily understood by one of ordinary skill in the art. Moreover, in light of the arguments above, Applicants submit it is easily understood by a person of ordinary skill that the Shiraishi reference, describing element 52b placed along side elements 60 and 61, does not describe at least a conductive layer is *sandwiched between* an insulative layer and an actuator finger.

The Examiner asserts the actuator finger is not a positive recitation of structure but merely an intention of use. *See* id. Applicants disagree. A reference to an "actuator finger" is a reference to a positive structural limitation of the actuator component embodiment described in claim 10. Moreover, claim 10 positively describes the manner in which the structural actuator finger (as an element of the "actuator component" described in claim 10) relates to the other structural elements of actuator component in multiple ways. ("...said conductive material and said insulative material are to be applied to an actuator finger one layer upon another in an alternating manner, and said layer of insulative material is wider than said layer of conductive material such that an insulative layer, applied to said actuator finger and sandwiching a conductive layer between said insulative layer and said actuator finger, at least partially encloses and electrically isolates said conductive layer latitudinal to said actuator finger.") Applicants respectfully submit the assertion that the multiple descriptions of the structural aspects of the actuator finger in claim 10 are intention of use is incorrect.

The description of Shiraishi fails to describe these limitations as well. Layers 60, 61, and 62 of the Shiraishi reference are discussed in detail in paragraphs 0051 and 0052. Paragraph

0051 describes the expansion and contraction operations of "electrostriction ingredient layer 60", "single-electrode layer 61", and "grand electrode layer 62". It further describes the terminal electrode connections used to achieve this purpose. Paragraph 0052 describes the relationship of the electric magnetic field to expansion and contraction (*i.e.*, potential difference "in agreement" with direction of polarization leads to expansion, and potential difference "contrary" to the direction of polarization leads to contraction). None of the other sections of Shiraishi describe layers 60, 61, and 62 in detail. Applicants request further support regarding the Examiner's assertions regarding elements 60, 61, and 62. Applicants submit neither these two sections nor the Shiraishi reference as a whole describes at least a conductive layer is sandwiched between the insulative layer and the actuator finger (*e.g.*, as described in the embodiment of claim 10).

In the Advisory Action, the Examiner reiterates the previous erroneous claim, alleging element 60 (the alleged insulating layer), element 61 (the alleged electrically-conductive layer) and element 52a (the alleged actuator finger) are sandwiched. *See* Advisory Action dated 1/26/2007, Exhibit A. However, Applicants submit, for at least the reasons described above, element 52a is located on a wholly separate structure *along side* the structure in Figure 6 including cited elements 60 and 61. This does not constitute *sandwiching between*.

Therefore, since for at least the preceding reasons each and every limitation is not taught or suggested in the Shiraishi references. Applicants submit it is inadequate to support proper 35 U.S.C. §102(b) and §103(a) rejections, and independent claim 10 should be allowed. Independent claim 16 includes similar limitations and therefore is also in condition for allowance for similar reasons. Claims 11-15 and 17-21 depend from allowable independent claims and therefore are allowable as well.

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CONCLUSION

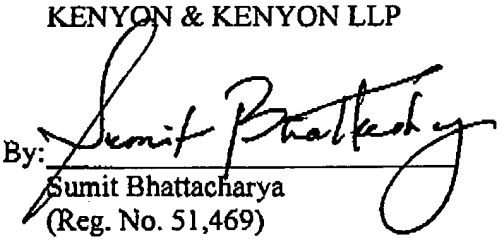
Appellants therefore respectfully request that the Board of Patent Appeals and Interferences reverse the Examiner's decision rejecting claims 10-21 and direct the Examiner to pass the case to issue.

The Examiner is hereby authorized to charge the appeal brief fee of **$500.00** and any additional fees which may be necessary for consideration of this paper to Kenyon & Kenyon Deposit Account No. **11-0600**.

Respectfully submitted,

KENYON & KENYON LLP

Date: March 13, 2007

By: 
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APPENDIX

(Brief of Appellants Ming Gao YAO et al.
U.S. Patent Application Serial No. 10/763,727)

8. CLAIMS ON APPEAL

1-9 (Cancelled)

10. An actuator component comprising:

at least one layer of electrically-conductive material; and

at least one layer of electrically-insulative material, wherein

said conductive material and said insulative material are to be applied to an actuator finger one layer upon another in an alternating manner, and

said layer of insulative material is wider than said layer of conductive material such that an insulative layer, applied to said actuator finger and sandwiching a conductive layer between said insulative layer and said actuator finger, at least partially encloses and electrically isolates said conductive layer latitudinal to said actuator finger.

11. The actuator component of claim 10, wherein said conductive material is a metal.

12. The actuator component of claim 11, wherein said conductive material is from the group consisting of Gold, Platinum, and Copper.

13. The actuator component of claim 10, wherein said insulative material is a piezoelectric ceramic material.

14. (Previously Presented) The actuator component of claim 13, wherein said insulative material is lead zirconate titanate.

15. (Previously Presented) The actuator component of claim 10, wherein said actuator finger is a hard disk drive micro-actuator finger.

16. (Previously Presented) A piezoelectric actuator comprising:

an actuator finger to receive application of at least one layer of electrically-conductive material and at least one layer of electrically-insulative material, said application being one layer upon another in an alternating manner, wherein

said layer of insulative material is wider than said layer of conductive material such that an insulative layer, applied to said actuator finger and sandwiching a conductive layer between said insulative layer and said actuator finger, at least partially encloses and electrically isolates said conductive layer latitudinal to said actuator finger.

17. (Previously Presented) The piezoelectric actuator of claim 16, wherein said conductive material is a metal.

18. (Previously Presented) The piezoelectric actuator of claim 17, wherein said conductive material is from the group consisting of Gold, Platinum, and Copper.

19. (Previously Presented) The piezoelectric actuator of claim 16, wherein said insulative material is a piezoelectric ceramic material.

20. (Previously Presented) The piezoelectric actuator of claim 19, wherein said insulative material is lead zirconate titanate.

21. (Previously Presented) The piezoelectric actuator of claim 16, wherein said actuator finger is a hard disk drive micro-actuator finger.

22-28 (Cancelled)

9. EVIDENCE APPENDIX

No further evidence has been submitted with this Appeal Brief.

10. RELATED PROCEEDINGS APPENDIX

Per Section 2 above, there are no related proceedings to the present Appeal.